

May 1, 2023

Oregon Department of Environmental Quality (DEQ)
Northwest Region Office
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Attention: Kevin Dana, Cleanup Project Manager

Subject: Response to Comments on Groundwater Source Control Evaluation Report
Crawford Street South Site
Portland, Oregon
ECSI No. 2363
File No. 6209-010-01

This letter responds to comments on the Groundwater Source Control Evaluation Report (GW SCE Report) for the Crawford Street South site (ECSI # 2363) located in Portland, Oregon (the Site) and transmits the Final BODR. A draft BODR was submitted to the Oregon Department of Environmental Quality (DEQ) on June 6, 2022. The DEQ provided comments in a letter dated March 27, 2023 and received on March 31, 2023; the DEQ included comments prepared by the U.S. Environmental Protection Agency (EPA) and the Five Tribes with its March 27, 2023 letter. The comments provided by each party are presented in italic font below, followed by our response in regular font.

RESPONSE TO DEQ COMMENTS

- 1. DEQ does not agree with GeoEngineers' ultimate conclusion that "no source control measures for groundwater are warranted." Although relatively few contaminants were detected at concentrations above cleanup levels (CULs) and/or screening-level values (SLVs) there are some exceedances (of metals and pesticides), and the exceedances tend to cluster in certain wells, such as MW-2. These exceedances will need to be addressed.*

A riverbank source control measure (RBSCM) is currently being designed for the Site. As detailed in the Basis of Design Report (BODR; GeoEngineers, 2022), the design considers and addresses the presence of chemicals of potential concern (COPCs) in groundwater. CAPSim modeling is being performed as a part of the design studies to assess the need for and amount of amendments that may be required in the riverbank cap to address both COPCs in groundwater that may flux through the cap as well as COPCs in riverbank soil which might leach into groundwater or porewater and flux through the cap. Therefore, groundwater containing COPCs that might migrate from the Site to the Willamette River will be addressed via the RBSCM.



2. *Four quarters of groundwater monitoring isn't enough to demonstrate a trend of decreasing contaminant concentrations. The observed decreases in contaminant concentrations from the first quarter to the fourth quarter of sampling could also be explained by seasonal fluctuations. To make the argument that groundwater contaminant concentrations are decreasing over time, GeoEngineers should consider additional rounds of monitoring for selected contaminants of potential concern so that, as an example, groundwater concentrations in September 2022 could be compared with groundwater concentrations in September 2023.*

GeoEngineers did not make the argument that the COPC concentrations were decreasing over time. Rather, GeoEngineers identified that the concentrations were generally stable or decreased from the first event to the last, supporting that the wells had stabilized and the ending concentrations appear to be the most representative. It is well established that the act of installing wells can disrupt an aquifer and the formation needs time to recover. Some recovery is established during well development but often, full recovery takes several weeks following installation and development, and this lack of recovery can interfere with the representativeness of the first round of sampling. The observation that several COPCs had noticeably lower concentrations in the final three sampling events relative to the first event supports this phenomena.

It is possible that the wells could be seasonally affected; however, inspecting the data relative to groundwater elevations (the manifestation of seasonal trends) did not indicate a correlation, as described in Section 3.5.4 of the report.

It is noted that the design of the cap for the RBSCM is not predicated on decreasing or seasonal trends. Rather, the CAPSim modeling utilizes both average and maximum COPC concentrations in groundwater, diminishing the importance of conclusions about trends. Conducting an additional year of quarterly groundwater monitoring would delay the design and implementation of the RBSCM and the limited presence and variability in the COC concentrations do not appear to warrant this delay. Therefore, additional groundwater monitoring is not proposed at this time.

3. *Further monitoring and analysis of the groundwater "mounds" on the east and west ends of the site would be needed to support the conclusion that the mounds "limit the amount of groundwater flux from the Site to the river."*

Additional analysis of the groundwater elevation data and groundwater flux is being performed as a part of the RBSCM design to assist in the CAPSim modeling and development of the cap design. The analysis will be presented in the Preliminary (30%-60%) Design report for the RBSCM, which will be submitted to the DEQ by June 15, 2023.

RESPONSE TO EPA COMMENTS

EPA comments were organized into "Primary," "To Be Considered," and "Matters of Style" and the response below follows this organization.

Primary

1. *The SCE report does not discuss the four seeps identified on the riverbank between MW-2 and MW-10 (Bridgewater Group, Inc, 2015). Seep sampling performed in 2007 showed elevated concentrations relative to the Record of Decision (ROD) Table 17 groundwater cleanup levels (CULs) (EPA 2017 and EPA 2020). While infiltrated stormwater may contribute to the seep*



discharge, data for the seep sampling should be presented in the SCE for comparison to the Table 17 CULs for groundwater (EPA 2020).

The data was presented in the SCE Work Plan (Cascadia, 2021) and compared to both JSCS screening levels and PHSS ROD Table 17 CULs for groundwater. Because the seeps are due to stormwater ponding and infiltrating at the top of bank during high intensity storms as documented in the SCE Work Plan and the historical Bridgewater Group reports, it is not appropriate to duplicate the presentation of this data in the groundwater SCE report. Stormwater is being managed via the implementation of an interim stormwater source control measure (GeoEngineers, 2021) until planned future site development occurs, whereafter, stormwater will be managed consistent with permitting requirements for the development.

- 2. The report should evaluate whether four quarters of monitoring are sufficient to adequately characterize the variations in groundwater conditions identified in the SCE. Contrary to the statements regarding groundwater flow direction in Section 2.6.2 as being generally flat and towards the river, several of the groundwater elevation contour maps show groundwater flow reversals from the river towards the upland. Additional data analysis and data collection are needed to support the conclusions of the SCE. Depending on the time of year that groundwater samples are collected, potential river inflow and/or groundwater mounding from stormwater infiltration could result in higher or lower groundwater concentrations than would be expected for a typical upland to river groundwater flow framework. A source control decision with respect to fate and transport of contaminants in the groundwater pathway cannot be completed without a better understanding of the groundwater characteristics and hydraulic flow.*

The Site has not been used for industrial purposes in more than 40 years and no sources to groundwater have been identified, with the exception of COPCs in the riverbank fill. The purpose of quarterly monitoring is to collect data across the seasons of a year affecting the groundwater conditions, e.g., times with greater or lesser surface water infiltration, times with higher and lower groundwater elevations, etc. These seasonal changes were observed during the four quarters of monitoring at the Site, allowing assessment of the potential seasonal effects on the groundwater conditions and COPC concentrations in the well samples. Specifically, groundwater samples were collected during times of mounding and during times without mounding, and during times of “typical upland to river groundwater flow” and times of inflow. Therefore, the conditions identified in the comment have been observed and the data needed to assess their effects has been collected. The data are being used to develop the cap design for the RBSCM and are considered sufficient for this purpose.

- 3. The report concludes that arsenic concentrations detected in groundwater above the PHSS CUL are consistent with regional background concentrations. There is no currently agreed upon set of background concentrations for metals in groundwater in the PHSS. Conclusions in the SCE report which are based on background metals concentrations should instead be compared directly to the ROD Table 17 CULs (EPA 2020).*

Noted.

To Be Considered

1. *Exceedance Quotients (EQs) for chemicals of potential concern (COPCs) are not relevant to the CULs established in the ROD Table 17 for the purposes of providing evidence to support a source control decision. Results should be compared directly to the ROD CULs.*

Results are compared directly to ROD CULs as shown on Tables 3 through 11 of the report.

2. *Section 2.5 Groundwater Monitoring, pages 5 and 6: Consider whether it is relevant to discuss monitoring wells located in or near areas of observed stormwater ponding; similar to what is presented for well MW-10 in the 2021 Interim Stormwater Source Control Measures Work Plan (GeoEngineers, 2021).*

Monitoring well MW-10 is the only well located in an area of consistent stormwater ponding at the Site.

3. *Section 3.5.1.1. Dioxin/Furan TEQ, TCDD. This section should be revised to present data and evaluations that follow rules per the Portland Harbor Data Management Plan (EPA 2021). The comparisons made are inappropriate to support the conclusions in this section. The evaluation of Dioxin/Furan TEQ presented is partially based upon tabulating values using non detected values as "zero" which is contrary to the general summation rules of the Portland Harbor Data Management Plan (EPA 2021).*

As shown on Table 3 of the report, the Dioxin TEQ is evaluated following the rules of the Portland Harbor Data Management Plan (DMP). It is also evaluated using non-detects assigned as zero for comparison purposes to better understand the impact that non-detect values have on the TEQ using the DMP approach.

4. *The discussion of concentration "trends" for COPCs discussed in Section 4.1 is not valid. A data set consisting of four quarters of monitoring is insufficient to determine a meaningful trend in concentration, especially given the highly variable hydraulic flow regime as noted in Primary Comment #2 above. When sufficient data have been collected, statistical trend analysis (e.g., Mann-Kendall or similar) of the data should be performed using the EPA Groundwater Statistical Tool (EPA 2018) or equivalent to appropriately evaluate concentration trends at the site.*

Section 3.5.4 of the report specifically states that statistical analysis of the data for trends is not representative because the groundwater data is from a 1-year quarterly sampling program and statistical analysis is not recommended by the guidance for the EPA Groundwater Statistics Tool when most of the data are non-detects (EPA, 2018). Section 3.5.4 goes on to state that the data was visually inspected to discern if concentrations were significantly higher or lower from the beginning to the end of the program and that groundwater elevation data and concentrations were plotted versus time for selected COPCs to assess whether a correlation with groundwater elevation data is apparent. Because the riverbank fill, the only identified source to groundwater, has been in place for more than 50 years, it would not be anticipated that significant trends over time would be observed, i.e., it would be anticipated that the COPC concentrations have largely equilibrated over the past 50 plus years and any variability would be due primarily to seasonal changes and/or the disturbance caused by the well installation. As identified above, the data are being used to develop the RBSCM and are considered sufficient for this purpose.



Matters of Style

1. *Section 3.5.4 Concentration Trends, Dioxins/Furans: Suggest adding "not" to the following sentence as indicated: "Inspection of the plots does not indicate a correlation between the TEQ concentration and groundwater elevation (i.e., the TEQ does **not** increase when the groundwater is within the riverbank fill) supporting that the fill is not acting as an ongoing source of dioxin/furans to groundwater."*

Corrected. Thank you for catching this.

RESPONSE TO THE FIVE TRIBES COMMENTS

1. *While many organic constituents were detected at the site, those detections are sporadic, at low levels, and fairly typical for an urban environment. GeoEngineers (2022a) uses a weight-of-evidence approach to conclude that groundwater at this site does not pose an unacceptable risk to the Willamette River. With one exception discussed in Comment #2, we find this conclusion reasonable.*

Noted. Thank you.

2. *Concentrations of metals are elevated at well MW-2, which is located in the area containing residual black sand. This appears likely to be foundry sand, a material once used commonly for fill. Foundry sand is typically high in metals, which is consistent with the elevated concentrations of cadmium, copper, lead, and zinc reported in soil samples from the vicinity by GeoEngineers (2022b). The contaminated black sands have clearly affected groundwater, as shown by the elevated concentrations in groundwater samples from MW-2. GeoEngineers (2022a, Figure 3) shows MW-2 located upgradient of most of the black sand deposits, suggesting there could be higher concentrations downgradient. As a protective measure, we recommend excavation and removal of the residual black sand from the site.*

Well MW-2 is installed within the area of the black sand fill and is screened across fill. When groundwater elevations are high, the groundwater is in direct contact with the fill. Groundwater concentrations in the samples from well MW-2 are anticipated to be representative of groundwater in the black sand fill; therefore, higher concentrations downgradient of the well are not anticipated. The groundwater data from well MW-2 is being used to develop the design of the sand cap, including the need for, and amount of amendments to address dissolved phase COCs in groundwater. Therefore, no additional excavation beyond that needed to complete the RBSCM is being proposed.

3. *On page 8, it is stated that apparent groundwater mounding on the eastern and western areas of the riverbank "appears to limit the amount of groundwater flux from the Site to the river." We find this improbable and if the language is retained, further justification is needed.*

This language was intended to identify that, at times, the river stage is higher than the groundwater elevation measured in the riverbank wells and at times there is groundwater mounding that occurs at the eastern and western ends of the riverbank boundary. The presence of a higher river elevation



relative to groundwater elevation will impede and limit groundwater flux at those times compared to a site where the typical upland to river discharge consistently occurs.

If you have any questions regarding this response to comments or the project in general, please do not hesitate to contact me at 503.577.1535 or aspencer@geoengineers.com.

Sincerely,
GeoEngineers, Inc.



Amanda Spencer, PE, RG
Principal Hydrogeologist

AS:mls

cc (electronically): Mat Cusma, SSI (pdf)
Tom Leaptrott, Steel Hammer Properties, LLC (pdf)
Paul Seidel, DEQ NWR (pdf)
Mark Pugh, DEQ NWR (pdf)
Dave Lacey, DEQ NWR (pdf)
Laura Hanna, EPA (pdf)

One copy submitted electronically and via hard copy

Disclaimer: Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

